PATENT COOPERATION TREATY

IN THE INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Applicant – GUARDIT TECHNOLOGIES, LLC

International Appln. No. PCT/US04/021371

International Filing Date -- 02 July 2004

Title – PORTABLE MOTION DETECTOR AND ALARM SYSTEM AND METHOD

AMENDMENT AND REPLY TO WRITTEN OPINION UNDER PCT ARTICLE 34

International Preliminary Examining Authority
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Gentlemen:

This is in response to the Written Opinion dated 12 January 2005. In the Written Opinion, claims 2, 3, 5-10, 15-20, 23-35, 37, 39-53 and 60-64 were indicated as satisfying all patentability requirements pertaining to novelty, inventive step and industrial applicability. Claims 1, 11-14, 21, 22, 36, 38, 54-59 and 65-67 were said to lack novelty under PCT Article 33(2) and claims 1, 4, 11-14, 21, 22, 36, 38, 54-59 and 65-67 were said to lack an inventive step under PCT Article 33(3). The drawings and description were also objected to on various grounds.

Please substitute the attached new page 17 of the drawing figures for page 17 of the drawing figures filed on 14 October 2005. The substituted page changes the designation "408" to "404" in Fig. 23 to overcome the drawing objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new page 28 for page 28 of the original application. The substituted page changes "host 260" to "host 261" on line 21 to overcome the description objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new page 33 for page 33 of the original application. The substituted page changes "module 408" to "module 404" on line 3, changes "board 408" to "board 410" and "antenna 410" to "antenna 412" on line 7, and changes "board 408" to

"board 410" on line 8 to overcome the description objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new page 38 for page 38 of the original application. The substituted page changes "512" to "510" on line 12 to overcome the description objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new page 40 for page 40 of the original application. The substituted page changes "526" to "556" on line 7 to overcome the description objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new page 42 for page 42 of the original application. The substituted page changes "namely;" to "namely," on line 6 to overcome the description objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new page 44 for page 44 of the original application. The substituted page inserts the clarifying language "to an "ALARM" state" at the end of the sentence on line 2. This identifies the "mode" being referred to and overcomes the description objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new page 58 for page 58 of the original application. The substituted page changes "batter" to "battery" on line 14 to overcome the description objection set forth in Box No. VII of the Written Opinion.

Please substitute the attached new pages 62-70 containing claims 1-57 for originally filed pages 62-72 containing claims 1-67. For ease of reference, a redlined-copy of the replacement claim pages is enclosed to indicate the manner in which the claims have been amended.

Original claims 1, 5, 7, 14, 16, 21, 40, 51, 55, 56, 58, 59, 64 and 67 have been substantively amended. Original claims 2, 3, 11, 12, 13, 17, 23, 36, 38, 54, 58 and 59 have been cancelled. The claim cancellations have resulted in a renumbering of the claims, as follows (original number on the left – current number on the right):

1 – 1	7 – 5	13 – canc.	19 – 13
2 – canc.	8 – 6	14 – 9	20 – 14
3 – canc.	9 – 7	15 – 10	21 – 15
4 – 2	10 – 8	16 – 11	22 – 16
5 – 3	11 – canc.	17 – canc.	23 – canc.
6 – 4	12 – canc.	18 – 12	24 – 17

25 – 18	36 – canc.	47 – 38	58 – 48
26 – 19	37 – 29	48 – 39	59 – 49
27 – 20	38 – canc.	49 – 40	60 – 50
28 – 21	39 – 30	50 – 41	61 – 51
29 – 22	40 – 31	51 – 42	62 – 52
30 – 23	41 – 32	52 – 43	63 – 53
31 – 24	42 – 33	53 – 44	64 – 54
32 – 25	43 – 34	54 – canc.	65 – 55
33 – 26	44 – 35	55 – 45	66 – 56
34 - 27	45 – 36	56 – 46	67 - 57
35 – 28	46 – 37	57 – 47	

Original claim 1 has been amended to recite a sensor in a vacuum environment per the concept of patentable claim 7. Claim 1 has also been amended on line 3 to change "movement an" to "movement of an" in order to overcome the claim objection set forth in Box VII of the Written Opinion. Claim 1 should now be patentable.

Claims 2 and 3 have been cancelled.

Original claim 4 (now claim 2) should be patentable based on the amendment to claim 1 from which it depends.

Original claim 5 (now claim 3) has been rewritten in independent form. Thus, there is no longer any issue of a claim covering a combination of a gyroscope sensor and an accelerometer sensor, as discussed in Box VIII of the Written Opinion. This claim should now be patentable.

Original claim 6 (now claim 4) has not been amended and should be patentable based on claim 5 from which it depends.

Original claim 7 (now claim 5) has been amended to remove the reference to a partial vacuum environment insofar as this was incorporated into amended claim 1. This claim was indicated as being patentable in the Written Opinion.

Original claim 8 (now claim 6) has been amended to remove the term "partial" before "vacuum environment" so as not to exclude a total vacuum, assuming such can be achieved.

Original claims 9-10 (now claims 7-8) have not been amended and were indicated as being patentable in the Written Opinion.

Original claims 11-13 have been cancelled.

Original claim 14 (now claim 9) has been amended to incorporate the limitations of patentable original claim 17 and original claim 17 has been cancelled. Claim 14 has also been amended on line 3 thereof to change "movement an" to "movement of an" in order to overcome the claim objection set forth in Box VII of the Written Opinion.

Original claim 15 (now claim 10) has not been amended and was indicated as being patentable in the Written Opinion.

Original claim 16 (now claim 11) has been amended to recite dependency from claim 10 (previously claim 15) in order to overcome the antecedent basis claim objection relative to "said audio files" set forth in Box No. VII of the Written Opinion.

Original claim 17 has been cancelled due to its limitations being incorporated into claim 9 (previously claim 14).

Original claims 18-20 (now claims 12-14) have not been amended and were indicated as being patentable in the Written Opinion.

Original claim 21 (now claim 15) has been amended to incorporate the limitations of original claim 23 (now cancelled), which was indicated as being patentable in the Written Opinion.

Original claim 22 (now claim 16) has not been amended and was indicated as being patentable in the Written Opinion.

Original claim 23 has been cancelled due to its limitations being incorporated into claim 15 (previously claim 21).

Original claims 24-35 (now claims 17-28) have not been amended and were indicated as being patentable in the Written Opinion.

Original claim 36 has been cancelled.

Original claim 37 (now claim 29) has not been amended and was indicated as being patentable in the Written Opinion.

Original claim 38 has been cancelled.

Original claims 39-53 (now claims 30-44) were indicated as being patentable in the Written Opinion, except for original claims 40 and 51, which were objected to. Claims 31 and 42 (originally claims 40 and 51) have been amended on line 3 thereof to change "movement an" to "movement of an" in order to overcome the claim objection set forth in Box VII of the Written Opinion.

Original claim 54 has been cancelled.

Original claim 55 (now claim 45) has been amended to incorporate limitations from claim 42 (originally claim 51) pertaining to a main housing carrying the piezoelectric element, the diaphragm and the mass, a circuit board, a battery and means for affixing the sensor to an object whose movement is to be detected.

Original claim 56 (now claim 46) has been amended to insert "wherein" after "claim 45" in order to overcome the claim objection set forth in Box VII of the Written Opinion. This claim should be patentable based on amended claim 45 (previously claim 55) from which it depends.

Original claim 57 (now claim 47) has not been amended and should be patentable based on amended claim 45 (previously claim 55) from which it depends.

Original claim 58 (now claim 48) has been amended to recite that the mass of the sensor is secured to a principal planar surface of one of the piezoelectric element and the diaphragm, and further that the mass is unstable by virtue of having a center of gravity that is separated from the planar surface and by virtue of being secured by way of a cantilever coupling connection whose cross-sectional area is less than that of the mass. This claim should now be patentable.

Original claim 59 (now claim 49) has been amended to recite that the mass of the sensor is secured to a principal planar surface of one of the piezoelectric element and the diaphragm, and further that the mass is unstable and unbalanced by virtue of having a center of gravity that is separated from the planar surface, by virtue of being secured by way of a cantilever coupling connection whose cross-sectional area is less than that of the mass, and by virtue of having an irregular non-symmetrical shape. This claim should now be patentable.

Original claims 60-63 (now claims 50-53) have not been amended and were indicated as being patentable in the Written Opinion.

Original claim 64 (now claim 54) has been rewritten in independent form and was indicated as being patentable in the Written Opinion.

Original claim 65-66 (now claims 55-56) have not been amended and should be patentable based on the amendment to claim 45 (previously 55) from which they depend.

Original claim 67 (now claim 57) has been amended to recite that a portable security alarm system in which there is a motion sensor and control circuitry for distinguishing between a vibration event and a long-wave motion event. The cited Lemelson reference requires discrete motions sensors in order to sense vibration and long wave motion. In contrast, the system of claim 57 (previously claim 67) requires only a single motion sensor, and the control circuitry distinguishes between the two types of motion. This represents an inventive step insofar as

Lemelson teaches that separate sensors are required for each type of motion being sensed. This claim has also been amended at line 3 to change "movement an object" to "movement of an object" to overcome the claim objection set forth in Box VII of the Written Opinion. This claim should now be patentable.

Based on the foregoing, an indication of patentability of all pending claims is requested.

Respectfully submitted,

GUARDIT TECHNOLOGIES LLC

By _____

Walter W. Duft
Agent for Applicant
Reg. No. 31,948

8616 Main Street, Suite 2
Williamsville, New York 14221
Tel. No. (716) 633-1930
Fax. No. (716) 633-1932

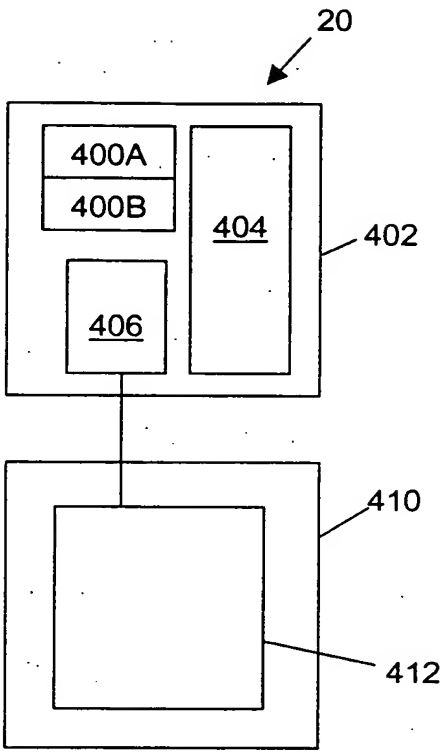
20
400A
400B
404
402
406
410
412

FIG. 23

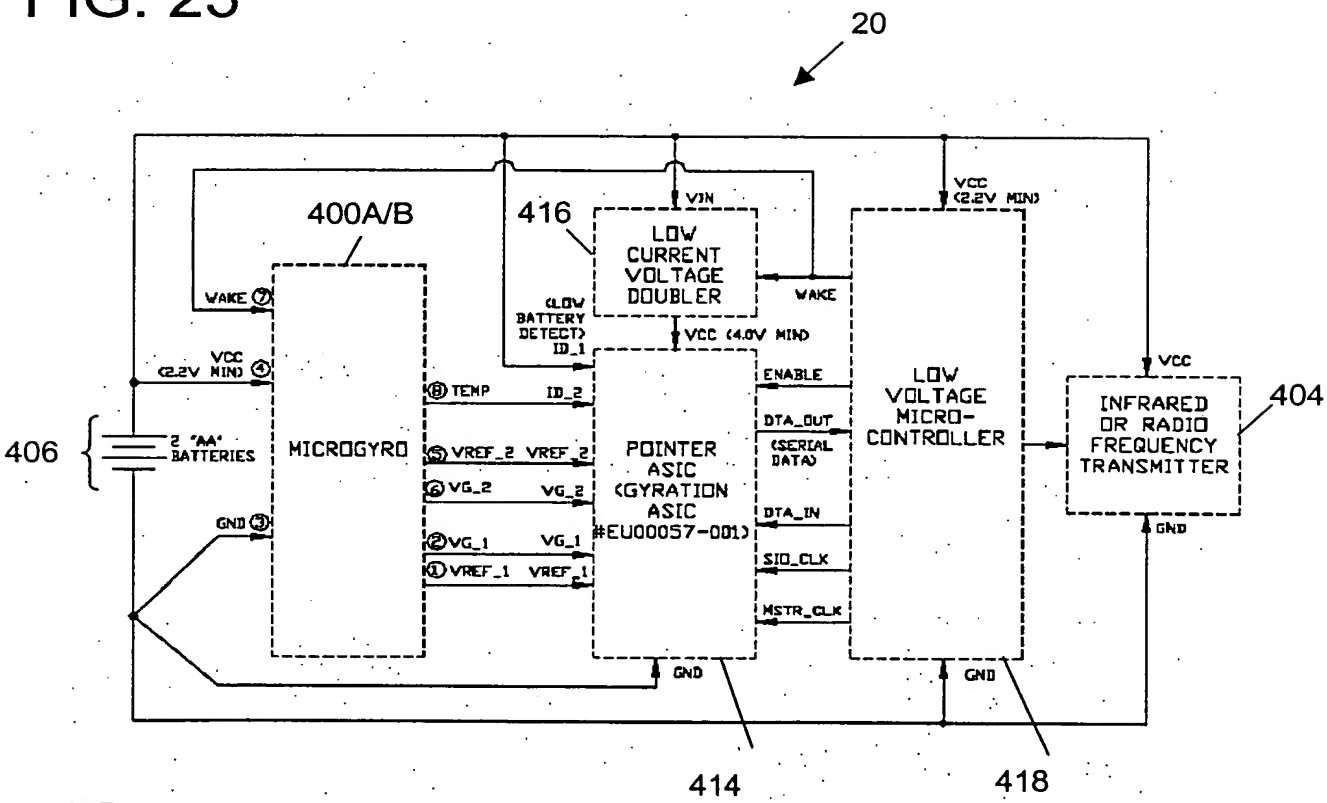
20
400A/B
416
LOW CURRENT VOLTAGE DOUBLER
VIN
VCC (2.2V MIN)
WAKE
(LOW BATTERY DETECT) ID_1
VCC (4.0V MIN)
VCC (2.2V MIN)
2 "AA" BATTERIES
406
MICROGYRO
TEMP
ID_2
VREF_2
VREF_2
VG_2
VG_2
VG_1
VG_1
VREF_1
VREF_1
GND
POINTER ASIC (GYRATION ASIC #EU00057-001)
ENABLE
DTA_OUT (SERIAL DATA)
DTA_IN
SIO_CLK
MSTR_CLK
LOW VOLTAGE MICRO-CONTROLLER
VCC
INFRARED OR RADIO FREQUENCY TRANSMITTER
404
GND
414
418

FIG. 24

records, along with the object identification information. The logging operation can be used to create a security record and also for billing purposes.

As a result of the security alert sent by the security administration system 260, the subscriber will be provided with very specific information about the nature of the security breach. In particular, because the object identification information is provisioned by the subscriber, it can be personalized in a way that allows the subscriber to gauge their response to the security alert according to the information provided. For example, a young mother on a warm summer day may wish to attach one movement detecting and signal transmitting means 20 to the baby's crib during nap time, and another movement detecting and signal transmitting means 20 to a partially open window in the baby's room. Upon receipt of the security alert, the mother will know from the object identification information that the alert is either the result of the baby waking up and jostling the crib or a potentially serious security breach due to an intruder attempting to raise the baby's window.

As will now be described with reference to the flow diagram of FIG. 22, it is very simple for a subscriber to provision each of their movement detecting and signal transmitting means 20 as these devices are attached to different objects. A network-attached computing device and a few moments of time to fill in an online form are all that is required. In step 290 of the provisioning process, the subscriber initiates contact with the computer host 261 and the latter establishes a communication session. In step 292, the computer host 261 prompts the subscriber for registration information (e.g., user name and password) if they have an existing account, or to set up a new account if the subscriber is not yet registered. If, in step 294, the subscriber indicates that they need to set up a new account, the computer host 261 engages the subscriber in an account setup dialog in step 296. This will establish a record of such information as the subscriber's name, billing address, login name, password, and an authentication identifier associated with the subscriber's receiver means 30. The subscriber will preferably also be requested to accept a subscription agreement. The computer host 261 will then create one or more account records in the subscriber database of the data storage resource 264, and if necessary, reserve storage space for the subscriber's provisioning information.

Following registration in step 296, or if the subscriber previously provided a registration number in step 292, the computer host 261 initiates a provisioning session

integrated RF transmitter/receiver may also be used, such as the RFM TR100 916.5 MHz hybrid transceiver (up to 1 Mbps data rate) available from RF Monolithics, Inc. of Dallas, Texas. Alternatively, instead of an RF transceiver, the communication module 404 could be constructed as an Infrared (IR) transceiver for "line-of-sight" communication with the receiver means 30. The battery pack 406 can be implemented using two 1.5 volt "AA" size batteries or equivalent.

A second component board 410 carries a patch antenna 412. The first component board 402 is overlaid onto the second component board 410, and the combination is mounted into a suitable housing (not shown) that may be similar in shape to unit shown in FIGS. 7-8 comprising the casing 31 and the rear panel 66, albeit of smaller size insofar as there is no need for the retractable wire and magnet components.

FIG. 24 illustrates the gyroscope sensors 400A and 400B, the communication module 404, and the battery pack 406, as well as additional exemplary circuit components that may be used to implement the movement detecting and signal transmitting means 20 of FIG. 23. In particular, an ASIC (Application Specific Integrated Circuit) 414 is implemented (using model number EU00057-001 from Gryation, Inc.) to process the gyroscope sensor outputs into coordinate values. A low current voltage doubler 416 steps up voltage from the battery pack 406 to power the ASIC 414. Also shown is a conventional low voltage microcontroller 418 that is programmed to provide various control and data storage functions.

In particular, the microcontroller 418 includes a memory for storing a unique identifier that uniquely identifies the movement detecting and signal transmitting means 20 during security operations. When an object to which the means 20 is attached is moved, the ASIC 414 passes coordinate values associated with the gyroscope sensors 400A and 400B to the microcontroller 418. The microcontroller 418 provides the coordinate values together with the unique identifier associated with the movement detecting and signal transmitting means 20 to the communication module 408 for transmission to the receiver means 30. The receiver means 30 is preferably implemented according to the configuration shown in FIG. 17 to include the control logic 222 and the data store 224. In addition to storing the unique identifier for the movement detecting and signal transmitting means 20, the data store 224 preferably maintains a set of last-known coordinate values for the movement detecting and signal transmitting means. The control

sense acceleration in one primary direction, either sensor can be oriented in a manner that allows it to sense an object's movement in two or even three directions. This can be done by orienting the sensor obliquely to the directions of interest. Movement in any one of the directions will then produce an acceleration component in the sensor's primary sensing direction. For example, if sensing in the x, y and z directions is desired, the sensor could be oriented so as to lie at 45 degrees in the x-y plane and 45 degrees in the y-z plane. Of course, an array of multiple sensors can always be used to measure acceleration in multiple directions.

Turning now to FIG. 29A, a schematic illustration of the movement detecting and signal transmitting means 20 is shown with an inertial sensor unit 550 incorporated therein. The sensor unit 550 can be implemented with one or more of the piezoelectric sensors 500, 510 or 520 described above, or with any other suitable accelerometer or gyroscope sensor. FIG. 29A also illustrates a microprocessor 552, an RF transceiver 554, and a battery/power supply module 556. The microprocessor 552 is shown by way of example only to be implemented as an MSP430F148 mixed signal microcontroller IC from Texas Instruments, Inc. of Dallas Texas. The RF transceiver 554 is shown by way of example only to be implemented as a TRF6901 RF-transceiver IC from Texas Instruments, Inc. Other like-kind devices could also be respectively used to implement the microprocessor 552 and the RF transceiver 554.

The output of the sensor unit 550 is provided to a microprocessor 552, which calculates one or more x, y and z coordinate values based on this input. These values can be forwarded by the RF transceiver 554 to the receiver means 30, for comparison with corresponding last-known coordinate values in the manner described above. A unique identifier for the movement detecting and signal transmitting means 20 is also sent. As described above, the comparison can be performed alternatively by the microprocessor 552. In that case, the receiver means 30 is only notified if a threshold change in position has been detected. No coordinate data needs to be sent. The movement detecting and signal transmitting means 20 only needs to send its unique identifier, and possibly optional status information, such as status code that specifies the type of motion (e.g., vibration, translation, rotation or some other external condition that triggered the sensor. Other status information, such as a "LOW BATTERY" code, a periodic "HEART

Another way to distinguish between vibrations and translations would be to provide frequency dependent circuitry for selectively sensing short wave motion (vibrations) from long wave motion (translations).

An optional light emitting diode D1 may be incorporated in the circuit to provide a visual indication that the sensor unit 500 has been disturbed by a motion in excess of the established thresholds. It will be seen that FIG. 29B also shows components of the power supply 556 that are used to provide the voltages "VA" and "VREF" used by the components of the sensing unit 550.

Turning now to FIG. 30, a modified version of the alarm system 10 is illustrated with additional wireless components not shown in FIG. 1. These additional components include an embodiment of the movement detecting and signal transmitting means 20 (removably mounted on the object 24 using adhesive strips or the like) that employs inertial sensing. Also shown is an information gathering device 90 embodied as a video or still image camera that can also be removably mounted to a desired location using adhesive strips or the like. The information gathering device 90 of FIG. 30 is assigned to one or more of the movement detecting and signal transmitting means 20. When any of such devices sense motion and transmit their unique identifier to the receiver means 30, the information gathering device 90 will also receive the message. The information gathering device 90 will begin transmitting images/video (and possibly audio information) to the receiver means 30, which is preferably configured to act as a remote notification device 92 as shown in FIG. 12. Note that the information gathering device 90 can also be activated by the receiver means 30, for periodic monitoring or if it is desired to have the receiver means 30 act as an intermediary between the movement detecting and signal transmitting means 20 and the information gathering device 90. In the latter scenario, the movement detecting and signal transmitting means would pass its unique identifier to the receiver means 30, which would then communicate with the information gathering device 90, instructing it to commence its information gathering function.

Two new components are also added to the alarm system 10 of FIG. 30; namely, a remote speaker system 600, and an environmental monitor 602. Both of these devices can be removably mounted at a desired location, as by adhesive strips or the like. FIG. 30 also shows an embodiment of the remote control unit 40 (which can be implemented as a key fob) in which there are three function buttons.

capacity of the audio file storage 614. However, a six-word audio message (optionally stored in several languages) should be sufficient for most purposes.

A security state code can also be sent by the receiver means 30 to indicate how the audio output should be generated. In particular, the receiver means 30 can be programmed so that each movement detecting and transmitting means 20 (as well as the environmental monitor 602) is assigned one of three distinct security states; namely, "ANNOUNCE," "ALERT" and "ALARM." The security code sent by the receiver means 30 corresponds to the current security state of the movement detecting and transmitting means 20 (or environmental monitor 602) that was activated. The microprocessor 610 in the speaker system 600 uses the security state code to modify the speaker system's audio output according to the corresponding security state. For example, assume a movement detecting and signal transmitting means 20 is mounted on the back door of a premises. When the back door opens, the speaker system 600 might announce "BACK DOOR!" a single time if the movement detecting and signal transmitting means is currently assigned the "ANNOUNCE" state. In the "ALERT" state, the speaker system 600 might announce "BACK DOOR!" multiple times or repeatedly until instructed by the receiver means 30 to terminate the output. In the "ALARM" state, the speaker system 600 might announce "BACK DOOR!" repeatedly plus generate a siren output until instructed by the receiver means 30 to stop. In addition, the receiver means 30 will preferably initiate a security notification to a remote location, such as the security administration system 260 of FIG. 20.

FIG. 32 shows an exemplary implementation of the environmental monitor 602. The environmental monitor 602 can be constructed as a modified version of the movement detecting and signal transmitting means 20 shown in FIG. 29A. In particular, there is a microprocessor 650, an RF transceiver 652, and a battery/power supply module 654. The microprocessor 650 is shown by way of example only to be implemented as an MSP430F148 mixed signal microcontroller IC from Texas Instruments, Inc. of Dallas Texas. The RF transceiver 652 is shown by way of example only to be implemented as a TRF6901 RF-transceiver IC from Texas Instruments, Inc. Other like-kind devices could also be respectively used to implement the microprocessor 650 and the RF transceiver 652.

sufficient time to disable the alarm system 10. The switch 27C can be used as an "AWAY" button that changes the mode of the alarm system 10 to an "ALARM" state.

As shown in FIG. 33, the remote control unit 40 can be implemented as a modified version of the movement detecting and signal transmitting means 20 shown in FIG. 29A. In particular, there is a microprocessor 700, an RF transceiver 702, and a battery/power supply module 704. The microprocessor 700 is shown by way of example only to be implemented as an MSP430F148 mixed signal microcontroller IC from Texas Instruments, Inc. of Dallas Texas. The RF transceiver 702 is shown by way of example only to be implemented as a TRF6901 RF-transceiver IC from Texas Instruments, Inc. Other like-kind devices could also be respectively used to implement the microprocessor 700 and the RF transceiver 702. FIG. 33 further shows a switch module 706 that provides the three switches 27A, 27B and 27C.

The remote control unit 40 can also be provided with an RFID (Radio Frequency Identification) circuit as part of (or separate from) the RF transceiver 702. This circuit becomes activated when the remote control unit 40 is brought into proximity with one of the movement detecting and signal transmitting means 20. It can thus be used when a person wishes to disturb a movement detecting and signal transmitting means 20 without generating a security response. When activated in this manner, the RFID circuit will provide the remote control unit's unique identifier (as an RFID tag) to movement detecting and signal transmitting means 20. If the latter is thereafter triggered within some period of time, it will append the RFID tag to its own transmission to the receiver means 30. The receiver means 30 can test the RFID tag to determine what response should be made (e.g., according to whether the remote control unit 40 is "RESTRICTED" or "UNRESTRICTED, " as described in more detail below).

The receiver means 30 of FIG. 30 acts as a central base station when used in the alarm system 10. Its primary function is to wait for coded messages transmitted wirelessly from the various components of the alarm system 10. In FIG. 30, this would include both of the movement detecting and signal transmitting means 20, the environmental monitor 602, the remote control unit 40, and the information gathering device 90. All of these components may be referred to as "triggers" because they communicate events to the receiver means 30 that cause a security response to be triggered. The security response may include playing prerecorded announcements and

construction 1200. In the construction 1200, the sensor 1100 is mounted in the support ring housing 1120. The latter includes mounting tabs 1202 that are secured onto conventional mounting clips 1204 extending from a circuit board 1206. The circuit board 1206 mounts circuit components of the type described above in previous embodiments for processing the output signal of the sensor 1100. The circuit board 1206 can also mount transceiver components for communicating with the receiver means 30. Alternatively, transceiver circuitry could be eliminated if stand-alone sensing is desired with a local sensing output only, or if the sensor 1100 is being used as a switch to control a device (see below).

A battery 1208 is mounted on the opposite side of the circuit board 1206 to power the circuitry thereon. The circuit board 1206 and all of its mounted components are placed within a main housing 1210. The main housing 1210 includes an upper cover 1212, and a lower cover 1214. The lower cover 1214 is removable to allow access to the battery 1208 for replacement thereof. The upper cover 1212 can also be configured for removability, i.e., by virtue of threads 1216, if desired. An adhesive member 1218 is mounted to the outer side of the lower cover 1214 to facilitate affixation of the construction 1200 to an object whose motion is to be sensed.

Note that miniaturization of the construction 1200 could be achieved by using the support ring housing 1120 of the sensor 1100 as a main housing. In that case, however, the circuit and battery components would have to be small enough to fit within the available footprint.

Turning now to FIG. 43, the present invention may be embodied in a portable security kit 1300. The kit 1300 includes a receiver means 30, a remote control unit 40 implemented as a key fob or the like, and plural movement detecting and signal transmitting means 20 implemented using the construction 1200 (or any other suitable construction). The foregoing components are seated in a portable carrying case 1302, along with product instructions 1304.

Accordingly, a portable security alarm system has been shown and described. While the invention has been described in conjunction with various embodiments, they are illustrative only, and it will be appreciated that many alternatives, modifications and variations will be apparent to persons skilled in the art in light of the foregoing detailed description. For example, the movement detecting and signal

CLAIMS

What is claimed is:

1. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial sensor disposed within a vacuum environment.

2. The system of claim 1 wherein said movement detecting and signal transmitting means comprises a piezo film accelerometer sensor.

3. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial accelerometer sensor with a piezoelectric audio transducer construction that includes a piezoelectric element mounted to a diaphragm, said sensor further including a mass attached to said diaphragm.

4. The system of claim 3 wherein said mass is one of a quantity of adhesive, a quantity of solder, or a solid object bonded to said diaphragm.

5. The system of claim 1 wherein said movement detecting and signal transmitting means comprises an accelerometer sensor with a piezoelectric audio transducer construction that includes a piezoelectric element mounted to a diaphragm.

6. The system of claim 5 wherein partial vacuum environment is provided by an airtight compartment.

7. The system of claim 6 wherein said airtight compartment is a vacuum sealed enclosure.

8. The system of claim 1 wherein said movement detecting and signal transmitting means further comprises a magnetic field sensor.

9. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, a receiver means for receiving said predetermined signal and providing a security response, and a remote speaker system adapted to receive wireless signals from said receiver means, and said speaker system having a unique identifier that said receiver means uses to communicate with said speaker system and to distinguish said speaker system from other speaker systems of like construction.

10. The system of claim 9 wherein said speaker system stores plural audio files.

11. The system of claim 10 wherein said speaker system is adapted to receive a wireless signal from said receiver means specifying one of said audio files and a security state code that specifies a manner in which the specified audio file is to be output.

12. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, a receiver means for receiving said predetermined signal and providing a security response, and a remote control unit comprising a first switch for setting said receiver means into a hold state, a second switch for setting said receiver means into an away state, and third switch for setting said receiver means into a panic state.

13. The system of claim 12 wherein said receiver means is adapted to respond to activation of said first switch by disarming itself from producing a security response for a

predetermined period, said predetermined period being selectable based on a manner in which said first switch is activated.

14. The system of claim 12 wherein said receiver means is adapted to arm itself for providing a security response when said second switch is activated.

15. A portable security alarm system for detecting a security condition and providing information relative thereto, said system comprising plural triggers for detecting said security condition and wirelessly transmitting a predetermined signal indicating said condition, and a receiver means for receiving said predetermined signal and providing a security response, said predetermined signal further including a unique identifier identifying said trigger and a status code providing information about a condition associated with said trigger, including information about a condition internal to said trigger.

16. The system of claim 15 wherein said status code provides information about a condition external to said trigger.

17. The system of claim 15 wherein said receiver means is adapted to maintain attribute information so that following receipt of said predetermined signal containing one of said status codes from one of said triggers, subsequent predetermined signals containing the same status code from the same trigger will be ignored until processing of the first predetermined signal is complete, but subsequent predetermined signals from the same trigger containing different status codes, and predetermined signals from other triggers, will be processed.

18. The system of claim 15 wherein said receiver means is adapted to associate each of said triggers with an assigned security state when said receiver means is in a home state, said security state being used to produce said security response when one of said triggers transmits said predetermined signal.

19. The system of claim 18 wherein said receiver means is adapted to override said default security states when said receiver means is in an away state.

20. The system of claim 15 wherein said receiver means includes a home state, an away state, and a panic state.

21. The system of claim 15 wherein said receiver means includes a quiet mode in which said security response produces fewer audible alarms than when said receiver means is not in said quiet mode.

22. The system of claim 15 wherein said receiver means is adapted to store word codes in association with said triggers that identify objects to which said triggers are mounted.

23. The system of claim 15 further including a remote control unit for controlling said receiver means and wherein said triggers are movement detecting and signal transmitting means for detecting movement of objects, said remote control units and said movement detecting and signal transmitting means each being assigned one of a restricted designation or an unrestricted designation, and said receiver means being adapted to prevent a restricted control unit from disarming said system relative to a restricted movement detecting and signal transmitting means, while allowing an unrestricted control unit to disarm said system relative to any of said movement detecting and signal transmitting means.

24. A security network comprising a security administration system and at least one portable security alarm system, said security administration system comprising a computer host programmed to respond to security alerts, a communication interface, and a data storage resource containing provisioned information for subscribers using said portable security alarm systems, said portable security alarm system comprising plural triggers adapted to detect a security condition and provide an indication thereof including a unique trigger identifier and a status code to a base station in wireless communication with said triggers, said base station storing word codes that identify objects to which said triggers are mounted and being adapted to implement a security response to a condition being sensed by any of said triggers, said security response including transmission of a base station identifier associated with said base station and a trigger identifier, a status code and a word code associated with one of said triggers to said security administration system.

25. The security network of claim 24 wherein said subscriber information provisioned by said security administration system includes contact information for each trigger of each of said portable security alarm systems, and wherein a security notification is made based on said contact information following receipt of said transmission from said base station.

26. The security network of claim 25 wherein said contact information includes contact information for plural security notification recipients, and wherein said security notification includes attempting contact of each recipient in sequence until one of said recipients responds.

27. The security network of claim 25 wherein said contact information includes contact information for plural security notification recipients, for plural languages, and wherein said security notification includes attempting contact of each recipient simultaneously.

28. The security network of claim 25 wherein said contact information includes contact information for plural security notification recipients, and wherein said security notification includes setting up a conference call among said recipients.

29. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, a receiver means for receiving said predetermined signal and providing a security response, and a remote control unit comprising a radio frequency identification circuit adapted to provide remote control unit identification information to said movement detecting and signal transmitting means, and said movement detecting and signal transmitting means being adapted to provide said remote control unit identification information along with said predetermined signal to said receiver means.

30. A security network comprising a security administration system and at least one portable security alarm system having a wireless receiver means and one or more

wireless movement detecting and signal transmitting means for transmitting security information to said receiver means, said security administration system comprising a computer host programmed to respond to security alerts from said at least one portable security alarm system, and being further programmed to provide information to said at least one portable security alarm system, said information including one of security alert notifications from a governmental agency, advertising or other commercial information.

31. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial sensor that includes a piezoelectric element mounted to a flexible diaphragm, and a mass on one of said piezoelectric element and said diaphragm.

32. The system of claim 31 wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that introduces a desired strain in said piezoelectric element through flexing of said diaphragm as said sensor is accelerated in a direction generally orthogonal to a principal plane of said diaphragm.

33. The system of claim 31 wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that is sized to introduce a desired strain in said piezoelectric element through a cantilever coupling moment as said sensor is accelerated in a direction generally parallel to a principal plane of said diaphragm.

34. The system of claim 31 wherein said mass is unstable.

35. The system of claim 31 wherein said mass is unstable and unbalanced.

36. The system of claim 35 wherein said mass comprises a primary mass element that is attached to one of said piezoelectric element and said diaphragm, and a secondary mass element on said primary mass element.

37. The system of claim 36 wherein said primary mass element is larger than said secondary mass element.

38. The system of claim 36 wherein one or both of said primary mass and said secondary mass are generally spherical in shape.

39. The system of claim 36 wherein said secondary mass element is on said primary mass element at a location that is offset from a line extending through said piezoelectric element and a center of gravity of said primary mass element.

40. The system of claim 31 wherein said inertial sensor comprises a piezoelectric audio transducer having said mass secured thereto.

41. The system of claim 31 wherein said inertial sensor comprises a support ring housing to which said diaphragm is mounted and which facilitates free-flexing of said diaphragm.

42. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial sensor that includes a piezoelectric element mounted to a diaphragm, and a mass on one of said piezoelectric element and said diaphragm, said sensor further including a main housing carrying said inertial sensor, a circuit board, a battery and means for affixing said movement detecting and signal transmitting means to said object.

43. The system of claim 42 wherein said diaphragm is mounted to a ring housing that is attached via clips to said circuit board.

44. The system of claim 42 wherein said means for affixing comprises adhesive.

45. An inertial sensor comprising a piezoelectric element mounted to a flexible diaphragm, and a mass on one of said piezoelectric element and said diaphragm, said sensor further including a main housing carrying said piezoelectric element, said diaphragm and said mass, a circuit board, a battery and means for affixing said sensor to an object whose movement is to be detected.

46. The sensor of claim 45 wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that introduces a desired strain in said piezoelectric element through flexing of said diaphragm as said sensor is accelerated in a direction generally orthogonal to a principal plane of said diaphragm.

47. The sensor of claim 45 wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that is sized to introduce a desired strain in said piezoelectric element through a cantilever coupling moment as said sensor is accelerated in a direction generally parallel to a principal plane of said diaphragm.

48. An inertial sensor comprising a piezoelectric element mounted to a flexible diaphragm, and a mass secured to a principal planar surface of one of said piezoelectric element and said diaphragm, wherein said mass is unstable by virtue of having a center of gravity that is separated from said planar surface and by virtue of being secured to said piezoelectric element or said diaphragm by way of a cantilever coupling connection whose cross-sectional area is less than that of said mass.

49. An inertial sensor comprising a piezoelectric element mounted to a flexible diaphragm, and a mass secured to a principal planar surface of one of said piezoelectric element and said diaphragm, wherein said mass is unstable and unbalanced by virtue of having a center of gravity that is separated from said planar surface, by virtue of being secured to said piezoelectric element or said diaphragm by way of a cantilever coupling connection whose cross-sectional area is less than that of said mass, and by virtue of having an irregular non-symmetrical shape.

50. The sensor of claim 49 wherein said mass comprises a primary mass element that is attached to one of said piezoelectric element and said diaphragm, and a secondary mass element on said primary mass element.

51. The sensor of claim 50 wherein said primary mass element is larger than said secondary mass element.

52. The sensor of claim 50 wherein one or both of said primary mass and said secondary mass are generally spherical in shape.

53. The sensor of claim 50 wherein said secondary mass element is on said primary mass element at a location that is offset from a line extending through said piezoelectric element and a center of gravity of said primary mass element.

54. An inertial sensor comprising a piezoelectric element mounted to a flexible diaphragm, and a mass on one of said piezoelectric element and said diaphragm, wherein said sensor comprises a piezoelectric audio transducer having said mass secured thereto.

55. The sensor of claim 55 wherein said sensor comprises a support ring housing to which said diaphragm is mounted and which facilitates free-flexing of said diaphragm.

56. The sensor of claim 55 in combination with a device that is activated or deactivated by said sensor.

57. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising a motion sensor and control circuitry for distinguishing between a vibration event and a long-wave motion event.

CLAIMS

What is claimed is:

1. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial sensor [illegible].

[illegible]

[illegible]

2. The system of claim 1 wherein said movement detecting and signal transmitting means comprises a piezo film accelerometer sensor.

[illegible]

[illegible] A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial accelerometer sensor with a piezoelectric audio transducer construction that includes a piezoelectric element mounted to a diaphragm, said sensor further including a mass attached to said diaphragm.

4. The system of claim 3 wherein said mass is one of a quantity of adhesive, a quantity of solder, or a solid object bonded to said diaphragm.

—. The system of claim 1 wherein said movement detecting and signal transmitting means comprises an accelerometer sensor with a piezoelectric audio transducer construction that includes a piezoelectric element mounted to a diaphragm~~, with said piezoelectric element and said diaphragm being disposed within a partial vacuum environment~~.

—. The system of claim [illegible] wherein partial vacuum environment is provided by an airtight compartment.

—. The system of claim [illegible] wherein said airtight compartment is a vacuum sealed enclosure.

—. The system of claim 1 wherein said movement detecting and signal transmitting means further comprises a magnetic field sensor.

~~[illegible] A portable security alarm system for detecting the movement of [illegible] and providing information relating to said movement, said system comprising: movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a first predetermined signal indicating movement of said object; environmental monitor means for sensing an environmental condition and wirelessly transmitting a second predetermined signal indicating said environmental condition; and a receiver means for receiving said first and second predetermined signals and providing a security response.~~

~~12. A system in accordance with claim 11 wherein said environmental [illegible] is separate from said movement detecting and signal transmitting means.~~

~~[illegible] A system in accordance with claim 11 wherein said [illegible] condition includes one or more of temperature, smoke level, carbon monoxide level, [illegible] hydrocarbon [illegible] level.~~

—. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, a receiver means for receiving said predetermined signal and providing a security response, and a remote speaker system adapted to receive wireless signals from said receiver means and said speaker system to [illegible] a unique identifier that said receiver means uses to communicate with said speaker system and to distinguish said speaker system from other speaker systems of the same [illegible].

—. The system of claim — wherein said speaker system stores plural audio files.

—. The system of claim — wherein said speaker system is adapted to receive a wireless signal from said receiver means specifying one of said audio files and a security state code that specifies a manner in which the specified audio file is to be output.

[redacted]

—. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, a receiver means for receiving said predetermined signal and providing a security response, and a remote control unit comprising a first switch for setting said receiver means into a hold state, a second switch for setting said receiver means into an away state, and third switch for setting said receiver means into a panic state.

—. The system of claim 1218 wherein said receiver means is adapted to respond to activation of said first switch by disarming itself from producing a security response for a

predetermined period, said predetermined period being selectable based on a manner in which said first switch is activated.

[illegible]. The system of claim [illegible] wherein said receiver means is adapted to arm itself for providing a security response when said second switch is activated.

[illegible]. A portable security alarm system for detecting a security condition and providing information relative thereto, said system comprising plural triggers for detecting said security condition and wirelessly transmitting a predetermined signal indicating said condition, and a receiver means for receiving said predetermined signal and providing a security response, said predetermined signal further including a unique identifier identifying said trigger and a status code providing information about a condition associated with said trigger [illegible].

[illegible]. The system of claim [illegible] wherein said status code provides information about a condition external to said trigger.

[illegible]

[illegible]. The system of claim [illegible] wherein said receiver means is adapted to maintain attribute information so that following receipt of said predetermined signal containing one of said status codes from one of said triggers, subsequent predetermined signals containing the same status code from the same trigger will be ignored until processing of the first predetermined signal is complete, but subsequent predetermined signals from the same trigger containing different status codes, and predetermined signals from other triggers, will be processed.

[illegible]. The system of claim [illegible] wherein said receiver means is adapted to associate each of said triggers with an assigned security state when said receiver means is in a home state, said security state being used to produce said security response when one of said triggers transmits said predetermined signal.

—. The system of claim 1823 wherein said receiver means is adapted to override said default security states when said receiver means is in an away state.

—. The system of claim 1821 wherein said receiver means includes a home state, an away state, and a panic state.

—. The system of claim 1821 wherein said receiver means includes a quiet mode in which said security response produces fewer audible alarms than when said receiver means is not in said quiet mode.

—. The system of claim — wherein said receiver means is adapted to store word codes in association with said triggers that identify objects to which said triggers are mounted.

—. The system of claim — further including a remote control unit for controlling said receiver means and wherein said triggers are movement detecting and signal transmitting means for detecting movement of objects, said remote control units and said movement detecting and signal transmitting means each being assigned one of a restricted designation or an unrestricted designation, and said receiver means being adapted to prevent a restricted control unit from disarming said system relative to a restricted movement detecting and signal transmitting means, while allowing an unrestricted control unit to disarm said system relative to any of said movement detecting and signal transmitting means.

—. A security network comprising a security administration system and at least one portable security alarm system, said security administration system comprising a computer host programmed to respond to security alerts, a communication interface, and a data storage resource containing provisioned information for subscribers using said portable security alarm systems, said portable security alarm system comprising plural triggers adapted to detect a security condition and provide an indication thereof including a unique trigger identifier and a status code to a base station in wireless communication with said triggers, said base station storing word codes that identify objects to which said triggers are mounted and being adapted to implement a security response to a condition being sensed by any of said triggers, said security response including transmission of a base station identifier

associated with said base station and a trigger identifier, a status code and a word code associated with one of said triggers to said security administration system.

—. The security network of claim [illegible] wherein said subscriber information provisioned by said security administration system includes contact information for each trigger of each of said portable security alarm systems, and wherein a security notification is made based on said contact information following receipt of said transmission from said base station.

—. The security network of claim [illegible] wherein said contact information includes contact information for plural security notification recipients, and wherein said security notification includes attempting contact of each recipient in sequence until one of said recipients responds.

—. The security network of claim [illegible] wherein said contact information includes contact information for plural security notification recipients, for plural languages, and wherein said security notification includes attempting contact of each recipient simultaneously.

—. The security network of claim [illegible] wherein said contact information includes contact information for plural security notification recipients, and wherein said security notification includes setting up a conference call among said recipients.

[illegible]

—. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, a receiver means for receiving said predetermined signal and providing a security response, and a remote control unit comprising a radio frequency identification circuit adapted to provide remote control unit identification information to said movement detecting and signal transmitting means, and said movement detecting and signal transmitting means being adapted to provide said remote control unit identification information along with said predetermined signal to said receiver means.

—. A security network comprising a security administration system and at least one portable security alarm system having a wireless receiver means and one or more wireless movement detecting and signal transmitting means for transmitting security information to said receiver means, said security administration system comprising a computer host programmed to respond to security alerts from said at least one portable security alarm system, and being further programmed to provide information to said at least one portable security alarm system, said information including one of security alert notifications from a governmental agency, advertising or other commercial information.

—. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial sensor that includes a

piezoelectric element mounted to a flexible diaphragm, and a mass on one of said piezoelectric element and said diaphragm.

[illegible]. The system of claim 3140 wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that introduces a desired strain in said piezoelectric element through flexing of said diaphragm as said sensor is accelerated in a direction generally orthogonal to a principal plane of said diaphragm.

—. The system of claim 3140 wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that is sized to introduce a desired strain in said piezoelectric element through a cantilever coupling moment as said sensor is accelerated in a direction generally parallel to a principal plane of said diaphragm.

—. The system of claim 3140 wherein said mass is unstable.

—. The system of claim 3140 wherein said mass is unstable and unbalanced.

[illegible]. The system of claim 3544 wherein said mass comprises a primary mass element that is attached to one of said piezoelectric element and said diaphragm, and a secondary mass element on said primary mass element.

[illegible]. The system of claim 3645 wherein said primary mass element is larger than said secondary mass element.

[illegible]. The system of claim 3645 wherein one or both of said primary mass and said secondary mass are generally spherical in shape.

[illegible]. The system of claim 3645 wherein said secondary mass element is on said primary mass element at a location that is offset from a line extending through said piezoelectric element and a center of gravity of said primary mass element.

[illegible]. The system of claim 3140 wherein said inertial sensor comprises a piezoelectric audio transducer having said mass secured thereto.

—. The system of claim 31 wherein said inertial sensor comprises a support ring housing to which said diaphragm is mounted and which facilitates free-flexing of said diaphragm.

—. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising an inertial sensor that includes a piezoelectric element mounted to a diaphragm, and a mass on one of said piezoelectric element and said diaphragm, said sensor further including a main housing carrying said inertial sensor, a circuit board, a battery and means for affixing said movement detecting and signal transmitting means to said object.

—. The system of claim 42 wherein said diaphragm is mounted to a ring housing that is attached via clips to said circuit board.

—. The system of claim 42 wherein said means for affixing comprises adhesive.

—. An inertial sensor comprising a piezoelectric element mounted to a flexible diaphragm, and a mass on one of said piezoelectric element and said diaphragm, said sensor further including a main housing carrying said piezoelectric element, said diaphragm and said

[illegible] mounting board, a battery and means for affixing said [illegible] movement is to be detected.

[illegible]. The sensor of claim [illegible] wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that introduces a desired strain in said piezoelectric element through flexing of said diaphragm as said sensor is accelerated in a direction generally orthogonal to a principal plane of said diaphragm.

[illegible]. The sensor of claim [illegible] wherein said mass is secured to said piezoelectric element or said diaphragm by way of a coupling connection that is sized to introduce a desired strain in said piezoelectric element through a cantilever coupling moment as said sensor is accelerated in a direction generally parallel to a principal plane of said diaphragm.

[illegible]. [illegible] An inertial sensor comprising [illegible] mounted to a flexible diaphragm, and a mass secured to a principal planar surface [illegible] said piezoelectric element and said diaphragm, wherein said mass is unstable [illegible] having a center of gravity that is separated from said planar surface and by virtue of being secured to said piezoelectric element or said diaphragm by way of a cantilever coupling [illegible] whose cross-sectional area is less than that of said mass.

[illegible]. [illegible] An inertial sensor comprising a piezoelectric element mounted to a flexible diaphragm, and a mass secured to a principal planar surface of one of said piezoelectric element and said diaphragm, wherein said mass is unstable and unbalanced by virtue of having a center of gravity that is separated from said planar surface, by virtue of being secured to said piezoelectric element or said diaphragm by way of a cantilever coupling connection whose cross-sectional area is less than that of said mass, and by virtue of having an irregular non-symmetrical shape.

[illegible]. The sensor of claim [illegible] wherein said mass comprises a primary mass element that is attached to one of said piezoelectric element and said diaphragm, and a secondary mass element on said primary mass element.

—. The sensor of claim [illegible] wherein said primary mass element is larger than said secondary mass element.

—. The sensor of claim [illegible] wherein one or both of said primary mass and said secondary mass are generally spherical in shape.

—. The sensor of claim [illegible] wherein said secondary mass element is on said primary mass element at a location that is offset from a line extending through said piezoelectric element and a center of gravity of said primary mass element.

—. [illegible] wherein said sensor comprises a piezoelectric audio transducer having said mass secured thereto.

—. The sensor of claim 55 wherein said sensor comprises a support ring housing to which said diaphragm is mounted and which facilitates free-flexing of said diaphragm.

—. The sensor of claim 55 in combination with a device that is activated or deactivated by said sensor.

—. A portable security alarm system for detecting the movement of an object and providing information relative to said movement, said system comprising a movement detecting and signal transmitting means for detecting movement of an object and wirelessly transmitting a predetermined signal indicating movement of said object, and a receiver means for receiving said predetermined signal and providing a security response, said movement detecting and signal transmitting means comprising a ~~long-wave~~ motion sensor [illegible] and control circuitry for distinguishing between a vibration event and a long-wave motion event.